APPENDIX VI
The DOE's Transuranic and Mixed Waste Focus Area Alternatives To Incineration Preliminary Research, Development, Demonstration and Deployment Plan

Executive Summary

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For over ten years, the Department of Energy (DOE) has successfully incinerated a variety of the organic-based mixed wastes that were generated from its past and present nuclear energy, waste remediation, and weapons missions. However, some of these waste streams are not amenable to efficient incineration since they contain transuranics, mercuric compounds, explosives, and/or reactives. Additionally, public concern over incinerator emissions, and the recently mandated Environmental Protection Agency (EPA) requirements to enhance monitoring and treatment of these emissions, has caused the DOE to consider closure of all three of its mixed waste incinerators complex wide. As a result, the DOE's Transuranic and Mixed Waste Focus Area (TMFA) has established a new plan for developing, and deploying the cost effective and timely alternative technologies necessary for replacing the role of incineration. [1]

The strategy presented in the plan is most applicable to those wastes that will be generated in the out years as a result of extensive remediation and DOE site closure activities. The majority of the legacy mixed waste volumes immediately displaced as a result of near –term incineration closure may be treated through the private sector and may not be, except in specific cases, impacted by the plan.

The preliminary plan to develop these alternative methods requires a broad range of efforts over the various stages of development, including those of basic science research and full-scale integrated demonstrations. To be successful, the specific development and deployment plan to be initiated in FY 2001 by DOE's Transuranic and Mixed Waste Focus Area (TMFA) must include regulatory and public input, in addition to the traditional technical component. The regulatory issues are to be addressed by working directly with the various State and Federal agencies (e.g., the Environmental Protection Agency/EPA) throughout the alternatives development process. Through communication with these agencies, various developers will be informed of the data needed to ensure permitting, and will be notified of pending regulatory changes that may effect the future applicability of their alternative technology. Likewise stakeholder and public issues will be addressed by presenting the strategy, as well as periodic status reports to established stakeholder groups. As a result of the presentations, stakeholders will play an active role in the process by providing criteria for selecting and testing alternatives. Additionally, public perception will be gauged through the presentations and various efforts of the alternatives development plan will be redirected, altered, or terminated as appropriate.

[1] A budget for the plan has also been prepared and it provides recommended estimates of resources for the next four fiscal years. This budget is presented as a Table in Section IV A. Overview of the Evolving DOE Plan. As indicated by the table, the present TMFA allocated FY2001-2002 budgets are tabulated along with a recommended plus-up budget required to address the proposed plan.

Technical issues will be addressed through a development effort involving a side-by-side comparative study of emerging alternative methods to incineration. Based, in part on an independent peer review, methods selected for the study will include near ready or relatively mature technologies. The comparative study will involve collecting the necessary performance, design, scale-up, and permitting data for each selected technology. Testing with identical waste surrogates and actual wastes will ensure that each alternative technology generates comparable data. Starting in FY 2001, the TMFA will prepare the required facilities for housing the comparison tests and issue the appropriate competitive calls to initiate the testing program in FY 2002.

DOE's Western Environmental Technology Office (WETO) in Butte MT will support the majority of the comparison testing and will be equipped with the required additional monitoring and analytical equipment in FY2001. Based on the competitive solicitation issued in 2001, three to five primary alternative treatment processes will be selected for comparison testing at WETO in FY 2002. The current strategy is to select enough processes to represent the three general classes of alternatives: thermal, aqueous based chemical oxidation (including dehalogenation), and separations. In addition to the primary alternative test units to be located at WETO, on-going tests of other alternative methods at other locations will be leveraged and altered in a manner to make them consistent with the comparative studies at WETO. A number of these leveraged alternative methods will involve on-going TMFA funded projects already addressing specific DOE issues in regard to both mixed low-level and transuranic waste. In addition to surrogate waste testing at WETO and alternative sites, demonstrations using actual wastes of interest will be performed on selected technologies with the highest potential for success. Additionally, if the requested budget levels are obtained for FY-2001, limited testing on selected technologies will be initiated as early as FY-2001.

The scheduled three-year long comparative study of near ready or mature alternatives will be supplemented with a series of basic science research efforts, as well as with development activities to optimize the ancillary systems required for completely integrated alternative methods. The efforts in basic science research will span three years and, at a minimum, will include extensive studies in material research, off –gas pollutant formation, and long-term waste form stability, as well as on new concepts for organic separation and destruction. Ancillary system testing will include activities involving pretreatment, waste feed pre-sizing, off –gas monitoring, and residue stabilization. Upon completion of the comparison testing in FY-2004, two to three of the higher performing alternatives will be selected for integrated prototype testing, starting in early FY2006. The selection will be based on an additional peer review by an independent consulting panel as well as on any feed back received from the established public stakeholder groups. If appropriate, the current plan is to conduct this final test phase at a single location. This integrated testing is expected to last at least two years, culminating with deployments by 2007.